

In re Patent Application of:
BILLHARTZ ET AL.
Serial No. 10/767,794
Filing Date: JANUARY 29, 2004

In the Claims:

1. (Original) A wireless communications system
comprising:

a plurality of wireless communications devices each
having a device type associated therewith from among a plurality
of different device types, and each device type having a known
device latency associated therewith; and

a wireless device locator comprising

at least one antenna and a transceiver connected
thereto, and

a controller for cooperating with said transceiver
for transmitting a plurality of location finding
signals to a target wireless communications device from
among said plurality of wireless communications
devices;

said target wireless communications device
transmitting a respective reply signal for each of said
location finding signals;

said controller of said wireless device locator
also for

cooperating with said transceiver for receiving
the reply signals,

determining a propagation delay associated with
the transmission of each location finding signal and
the respective reply signal therefor based upon the

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known device latency of said target wireless communications device, and
estimating a range to said target wireless communications device based upon a plurality of determined propagation delays.

2. (Original) The wireless communications system of Claim 1 wherein said controller estimates the range based upon an average of the propagation delays.

3. (Original) The wireless communications system of Claim 1 wherein each wireless communications device has a unique identifier (UID) associated therewith; wherein said controller inserts the UID for said target wireless communications device in each of the location finding signals; and wherein said target wireless communications device generates respective reply signals based upon the UID in the locations signals.

4. (Original) The wireless communications system of Claim 3 wherein said target wireless communications device generates unsolicited signals including the UID thereof; wherein said controller cooperates with said transceiver to receive at least one unsolicited signal from said target device; and wherein said controller determines the UID for said target wireless communications device from the at least one unsolicited signal.

5. (Original) The wireless communications system of

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Claim 4 wherein said controller determines the device type of said target wireless communications device based upon the UID thereof.

6. (Original) The wireless communications system of Claim 5 wherein the UIDs comprise media access control (MAC) addresses of respective wireless communications devices, and wherein said controller determines the device type of said target wireless communications device based upon the MAC address thereof.

7. (Original) The wireless communications system of Claim 1 wherein said at least one antenna comprises a plurality of antennas; and wherein said controller cooperates with said plurality of antennas to determine a bearing to said target wireless communications device based upon at least one of the received reply signals.

8. (Original) The wireless communications system of Claim 7 wherein the bearing is a three-dimensional bearing.

9. (Original) The wireless communications system of Claim 1 wherein said at least one antenna comprises at least one directional antenna.

10. (Original) The wireless communications system of Claim 1 wherein said wireless device locator further comprises a

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portable housing carrying said at least one antenna, said transceiver, and said controller.

11. (Original) The wireless communications system of Claim 1 wherein said wireless communications devices comprise wireless local area network (WLAN) devices.

12. (Original) The wireless communications system of Claim 1 wherein said wireless communications devices comprise mobile ad-hoc network (MANET) devices.

13. (Original) The wireless communications system of Claim 1 wherein said wireless communications devices comprise cellular communications devices.

14. (Original) A wireless communications system comprising:

a plurality of wireless local area network (WLAN) devices each having a device type associated therewith from among a plurality of different device types, and each device type having a known device latency associated therewith; and

a wireless device locator comprising

at least one antenna and a transceiver connected thereto, and

a controller for cooperating with said transceiver for transmitting a plurality of location finding signals to a target WLAN device from among said

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plurality of WLAN devices;

said target WLAN device transmitting a respective
reply signal for each of said location finding signals;

said controller of said wireless device locator
also for

cooperating with said transceiver for receiving
the reply signals,

determining a propagation delay associated with
the transmission of each location finding signal and
the respective reply signal therefor based upon the
known device latency of said target WLAN device, and

estimating a range to said target WLAN device
based upon an average of a plurality of determined
propagation delays.

15. (Original) The wireless communications system of
Claim 14 wherein each WLAN device has a unique identifier (UID)
associated therewith; wherein said controller inserts the UID for
said target WLAN device in each of the location finding signals;
and wherein said target WLAN device generates respective reply
signals based upon the UID in the locations signals.

16. (Original) The wireless communications system of
Claim 15 wherein said target WLAN device generates unsolicited
signals including the UID thereof; wherein said controller
cooperates with said transceiver to receive at least one
unsolicited signal from said target WLAN device; and wherein said

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controller determines the UID for said target WLAN device from the at least one unsolicited signal.

17. (Original) The wireless communications system of Claim 16 wherein said controller determines the device type of said target WLAN device based upon the UID thereof.

18. (Original) The wireless communications system of Claim 17 wherein the UIDs comprise media access control (MAC) addresses of respective WLAN devices, and wherein said controller determines the device type of said target WLAN device based upon the MAC address thereof.

19. (Original) The wireless communications system of Claim 14 wherein said at least one antenna comprises a plurality of antennas; and wherein said controller cooperates with said plurality of antennas to determine a bearing to said target WLAN device based upon at least one of the received reply signals.

20. (Original) A wireless device locator for locating a target wireless communications device comprising:

at least one antenna and a transceiver connected thereto; and
a controller for

cooperating with said transceiver for transmitting a plurality of location finding signals to the target wireless communications device and receiving a

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respective reply signal therefrom for each of said location finding signals,

determining a propagation delay associated with the transmission of each location finding signal and the respective reply signal therefor based upon a known device latency of the target wireless communications device, and

estimating a range to the target wireless communications device based upon a plurality of determined propagation delays.

21. (Original) The wireless device locator of Claim 20 wherein said controller estimates the range based upon an average of the propagation delays.

22. (Original) The wireless device locator of Claim 20 wherein the target wireless communications device has a unique identifier (UID) associated therewith; wherein said controller inserts the UID for the target wireless communications device in each of the location finding signals; and wherein the target wireless communications device generates respective reply signals based upon the UID in the locations signals.

23. (Original) The wireless device locator of Claim 22 wherein the target wireless communications device generates unsolicited signals including the UID thereof; wherein said controller cooperates with said transceiver to receive at least

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one unsolicited signal from the target device; and wherein said controller determines the UID for the target wireless communications device from the at least one unsolicited signal.

24. (Original) The wireless device locator of Claim 20 wherein said at least one antenna comprises a plurality of antennas; and wherein said controller cooperates with said plurality of antennas to determine a bearing to the target wireless communications device based upon at least one of the received reply signals.

25. (Original) The wireless device locator of Claim 20 wherein said at least one antenna comprises at least one directional antenna.

26. (Original) The wireless device locator of Claim 20 wherein said wireless device locator further comprises a portable housing carrying said at least one antenna, said transceiver, and said controller.

27. (Original) The wireless device locator of Claim 20 wherein the target wireless communications device comprises a wireless local area network (WLAN) device.

28. (Original) The wireless device locator of Claim 20 wherein the target wireless communications device comprises a mobile ad-hoc network (MANET) device.

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29. (Original) The wireless device locator of Claim 20 wherein the target wireless communications device comprises a cellular communications device.

30. (Original) A method for locating a target wireless communications device from among a plurality of wireless communications devices, each wireless communications device having a device type associated therewith from among a plurality of different device types, and each device type having a known device latency associated therewith, the method comprising:

transmitting a plurality of location finding signals to the target wireless communications device, and receiving a respective reply signal for each of the location finding signals therefrom;

determining a propagation delay associated with the transmission of each location finding signal and the respective reply signal therefor based upon the known device latency of the target wireless communications device; and

estimating a range to the target wireless communications device based upon a plurality of determined propagation delays.

31. (Original) The method of Claim 30 wherein the controller estimates the range based upon an average of the propagation delays.

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32. (Original) The method of Claim 30 wherein each wireless communications device has a unique identifier (UID) associated therewith; wherein the target wireless communications device generates unsolicited signals including the UID thereof; and further comprising:

receiving at least one unsolicited signal from the target device;

determining the UID for the target wireless communications device from the at least one unsolicited signal; and

inserting the UID in the location finding signals.

33. (Original) The method of Claim 32 further comprising determining the device type of the target wireless communications device based upon the UID thereof.

34. (Original) The method of Claim 30 further comprising determining a bearing to the target wireless communications device based upon at least one of the received reply signals.

35. (Original) The method of Claim 30 wherein the target wireless communications device comprises a wireless local area network (WLAN) device.

36. (Original) The method of Claim 30 wherein the target wireless communications device comprises a mobile ad-hoc

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network (MANET) device.

37. (Original) The method of Claim 30 wherein the target wireless communications device comprises a cellular communications device..